

Appl. No. 10/631,927
Paper dated February 27, 2006
Reply to Office Action dated December 5, 2005

REMARKS

Reconsideration of the above-identified application in view of the foregoing amendments and following remarks is respectfully requested. By this paper, claims 21-22, 25-26, 28 and 33-35 are cancelled without prejudice or disclaimer. Accordingly, the rejections of these claims pursuant to 35 U.S.C. § 103 are now moot.

New claims 36-44 are added. New independent claim 36 is directed to “[a]n exposure apparatus” and recites, *inter alia*:

“an optical element provided in a vacuum atmosphere; and a cooling apparatus for cooling the optical element using a radiation cooling,
wherein said cooling apparatus comprises:
a board arranged apart from the optical element, said board having a temperature that is smaller than a temperature of the optical element;
a Peltier element having a heat absorption surface and a heat radiation surface, and connected to the board through the heat absorption surface; and
a radiation block connected to the heat radiation surface, said radiation block having a channel to flow a coolant for cooling the heat radiation surface,
wherein a temperature of the coolant is substantially the same as the temperature of the optical element.”

Support for this claim is found throughout the application as originally filed, including for example at paragraph [0016].

New claim 37 recites “a detector for detecting temperature of the optical element, wherein a temperature of the heat absorption surface is controlled based on the temperature detected by the detector.” Support for this claim is found throughout the application as originally filed, including for example at paragraph [0038].

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New claim 38 recites "said optical element is a mirror." New claim 39 adds "said board faces a rear surface of the mirror." Support for this claim is found throughout the application as originally filed, including for example at paragraph [0017].

New claim 40 recites "a radiation shield member to shield radiation heat transfer between the board and a member different from the optical member." Support for this claim is found throughout the application as originally filed, including for example at paragraph [0016].

New claims 41-43 recite a difference between the temperature of the coolant and the temperature of the optical element is less than 5° C, 1° C and 0.2° C, respectively. Support for this claim is found throughout the application as originally filed, including for example at paragraph [0057].

New claim 44 is directed to "[a] device fabrication method" and recites "exposing an object to a pattern using an exposure apparatus according to claim 32; and developing the exposed object." Support for this claim is found throughout the application as originally filed, including for example at Figures 7 and 8.

No new matter will be added to this application by entry of these amendments.
Entry is respectfully requested.

The pending office action had rejected the then-pending claims pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,000,227 to Kroeker et al. ("Kroeker") in view of U.S. Patent Nos. 5,813,233 to Okuda et al. ("Okuda") and 6,298,669 to Maruyama et al. ("Maruyama"). [12/5/05 Office Action at pp. 2-5].

Kroeker is directed to a wafer cooling system. In Figures 5 and 6, Kroeker shows two embodiments of his wafer cooling system, having a coolant tank (140) for a cooler (122) disposed below a center of a mounting plate (126). A coolant fluid, such as water, flows through

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the coolant tank (140) to cool the cooling plate (142). [Kroeker, Col. 6, lines 34-35 and Col. 7, lines 19-22]. There is no discussion of the temperature of the coolant in Krocker. Among the deficiencies of Kroeker admitted by the office action is its fails to teach, disclose or suggest a temperature detector. [12/5/05 Office Action at p. 2]. Thus, Kroeker fails to teach, disclose or suggest "a temperature of the coolant is substantially the same as the temperature of the optical element" as in Applicant's claim 36.

Okuda is directed to a thermoelectric cooling device. Figure 27, cited by the office action, shows a constructional view of a thermoelectric cooling system for a liquid crystal projector. The text associated with that embodiment is silent as to the use of any coolant. However, in connection with Figure 24, Okuda describes a volatile coolant charged inside a heat pipe (50) joined to a hot-side face (32b) of a Peltier element (32). [Okuda, Col. 16, lines 16-19]. The coolant has a variable temperature and is heated by heat from the hot-side face (32b) and then is cooled and condensed after discharging heat through a radiating fin unit (36). [Okuda, Col. 16, lines 19-23]. Thus, Okuda does not control the temperature of the coolant and Okuda also fails to teach, disclose or suggest "a temperature of the coolant is substantially the same as the temperature of the optical element" as in Applicant's claim 36.

The office action relies on Murayama for its alleged disclosure of a Peltier element as recited in Applicant's claims. Without commenting of that assertion, Applicant notes that Murayama also fails to teach, disclose or suggest "a temperature of the coolant is substantially the same as the temperature of the optical element" as in Applicant's claim 36.

Accordingly, as Applicant cannot find the above-element of claim 36 in Kroeker, Okuda or Murayama, at least independent claim 36, and its dependent claims 37-44 are respectfully asserted to be in condition for allowance.

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Applicant has chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Likewise, Applicant has chosen not to swear behind Maruyama cited by the office action at this time. Applicant, however, reserves the right, as provided for under 37 C.F.R. § 1.131, to do so in the future as appropriate.

Finally, Applicant has not specifically addressed the rejections of the dependent claims. Applicant respectfully submits that the independent claims, from which they depend, are in condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance. Applicant, however, reserves the right to address such rejections of the dependent claims in the future as appropriate.

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CONCLUSION

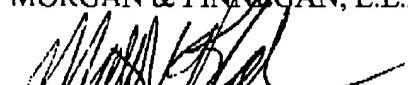
For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is requested. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 13-4500, ORDER NO. 1232-5091.

Respectfully submitted,
MORGAN & FINNEGAN, L.L.P.

Dated: February 27, 2006

By:


Matthew K. Blackburn
Registration No. 47,428

Correspondence Address:

MORGAN & FINNEGAN, L.L.P.
3 World Financial Center
New York, NY 10281-2101
(212) 415-8700 Telephone
(212) 415-8701 Facsimile